

Metabolic Challenges in The Semi-arid Region: A Critical Analysis of Nutritional Transition and Early Cardiovascular Risk

Leonardo Alves Santos,¹ Álvaro Eduardo Santos Oliveira,¹ Beatriz Vitória Carvalho Lordêlo,¹ Luis Antonio Cavalcanti Matias,¹ Rodrigo Mendes,¹ Pedro Pereira Tenório¹ 

Universidade Federal do Vale do São Francisco,¹ Paulo Afonso, BA – Brazil

Dear Editor,

We had the opportunity to review the article entitled “Assessment of Overweight/Obesity and Elevation of Blood Pressure in Schools in Rural and Urban Area in the Backlands of Bahia.”¹ We would like to congratulate the authors for their initiative in investigating a pediatric cohort in a region marked by social and climatic vulnerability, frequently underrepresented in scientific literature, as well as for highlighting the relevance of addressing childhood obesity and arterial hypertension – two major cardiovascular risk factors with direct impact on future morbidity and mortality.

The study is commendable for focusing on children aged 5 to 10 years, a critical period for the establishment of metabolic habits.² The inclusion of students from both urban and rural areas provides a clear view of the phenomenon of nutritional transition in the “Sertão,” a region simultaneously characterized by historical food insecurity and increasing exposure to obesogenic dietary patterns.³

The methodological precision is noteworthy, particularly the use of BMI z-scores and the adoption of international standards (WHO and North American reference) for waist circumference and blood pressure. The rigor in standardizing blood pressure measurement – performed according to the 2017 American Academy of Pediatrics guidelines, with multiple readings, exclusion of the first measurement, averaging of subsequent values, and appropriate cuff selection – is especially relevant in pediatric field studies and strengthens the robustness and reliability of the blood pressure findings.

However, the use of the North American reference (Fernandez, 2004) to classify waist circumference, due to the lack of national values, requires caution regarding external validity. The body habitus of children from the backlands of Bahia may differ from that of the U.S. population, which

could bias the estimation of cardiovascular risk associated with abdominal adiposity.^{3,4}

Another methodological point that deserves attention is the sample size. The study mentions an ideal calculation of 1,500 participants to ensure representativeness, but the final analysis included 461 children. It would be prudent to discuss whether this reduction affected the statistical power to detect significant differences between rural and urban areas in the nutritional categories ($p=0.21$), where a larger sample might have revealed hidden nuances.³

The finding of a 27.9% prevalence of overweight and 8% prevalence of elevated blood pressure raises an important epidemiological alert. Despite its relevance, we believe that some points could enhance the level of discussion and the clinical applicability of the data. Although the authors mention the low socioeconomic level, the analysis would gain depth if it considered local infrastructure variables such as access to sanitation and potable water – factors that, in the semi-arid region, directly influence subclinical inflammatory status and, consequently, early insulin resistance.⁵

The study reports a significantly higher mean systolic blood pressure among rural schoolchildren (92.6 mmHg) compared with those in urban areas (88.8 mmHg; $p=0.001$). This finding is intriguing, given that central obesity was more prevalent in the urban zone. It would be valuable to discuss whether specific dietary factors in rural areas (such as consumption of salt-preserved foods) or occupational heat stress could be influencing this biomarker.^{5,6} As a study aiming to assess cardiovascular risk, the absence of measurements such as high-sensitivity CRP or lipid profile limits the understanding of the metabolic phenotype of these children. We recognize the logistical challenges, but encourage the authors to consider these biomarkers in future phases.

The study presents children with elevated blood pressure levels, but the measurements obtained do not allow confirmation of a hypertension diagnosis. According to the Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents from the American Academy of Pediatrics, elevated blood pressure on three separate occasions is required to establish a diagnosis of hypertension in this age group. Thus, despite the appropriate standardization of the measurement method, factors such as white-coat hypertension, stress, and blood pressure variability may lead to elevated readings that do not reflect the child's usual blood pressure status.⁷

The lack of physical activity records and dietary recall is a limitation acknowledged by the authors. We suggest that,

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Mailing Address: Pedro Pereira Tenório

Universidade Federal do Vale do São Francisco, Colegiado de Medicina.
Avenida da Amizade, 1900. CEP: 48605-780. Bairro Sal Torrado, Paulo Afonso, BA – Brazil

E-mail: pedrotenorio28@gmail.com

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for future publications, the use of validated food-frequency questionnaires (such as QUADA-BR) could help clarify whether excess weight in the urban area stems from the consumption of ultra-processed foods or from physical inactivity. Including these variables would enable more robust analyses, expanding the explanatory capacity of the model and strengthening the external validity of the findings.

Additionally, considering that this cross-sectional study is part of a larger project involving an intervention in school

meals, it would be valuable to clarify whether these data represent the baseline and whether the authors observed longitudinal changes in these outcomes following the nutritional intervention mentioned.

In summary, the work by Lopes et al.¹ is a valuable contribution to pediatrics and preventive cardiology in Brazil. It reinforces that obesity and hypertension are no longer confined to developed urban centers, highlighting the need for public health policies adapted to the regional nuances of the Northeast.

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Reply

Ana Luísa Vaz Valois,¹ Ana Marice Teixeira Ladeia¹

Escola Bahiana de Medicina e Saúde Pública,¹ Salvador, BA – Brazil

We thank the authors for their close reading of our article and for their constructive and insightful comments regarding our study “Assessment of Overweight/Obesity and Elevation of Blood Pressure in Schools in Rural and Urban Area in the Backlands of Bahia.” We also appreciate their recognition of our study’s relevance in a pediatric population living in a context of social and climate vulnerability, as well as their acknowledgment of the methodological rigor adopted.¹

Concerning the use of international reference standards for waist circumference classification, we acknowledge the limitation regarding external validity. The absence of validated national standards for this population continues to pose a challenge, calling for cautious interpretation of these findings.

Regarding the sample size, the initial calculation of approximately 1,500 participants was performed for a broader research project, of which this study represents a specific analysis. Therefore, the sample analyzed in this study corresponds to a subset of a larger project, which should be taken into consideration when interpreting the results.

With respect to biomarkers, several laboratory parameters were measured within the context of the same

research project, including high-sensitivity C-reactive protein. These data were analyzed in a complementary study derived from the same project, expanding the characterization of this population’s cardiometabolic profile. Accordingly, although these variables were not included in the analysis presented in our study, they are part of the broader research scope.

Our finding of higher systolic blood pressure levels in rural schoolchildren, despite lower central obesity, is indeed relevant. As suggested, factors such as dietary patterns, sodium intake, and environmental stressors may contribute to this result; however, these variables were not evaluated in this study, and they warrant further investigation. We also emphasize that blood pressure measurements obtained during a single assessment do not allow for a definitive diagnosis of hypertension, in accordance with current pediatric guidelines. Our objective was to identify elevated blood pressure levels as a potential marker of cardiovascular risk rather than to establish a clinical diagnosis.

We thank the authors again for their valuable contributions, which have enriched the discussion and highlighted relevant directions for future research.

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